



## GEOGRAPHICAL RICHNESS OF MEDICINAL PLANTS IN AND AROUND SANGLI

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### ABSTRACT:

*Richness of biodiversity with reference to ethnic medicinal plants is well known. Indigenous Indian medicinal plants have been established all over the world, as excellent therapeutic agents. Sangli, situated in the rich and fertile bed of Krishna river bank is endowed with a large number of medicinal plants. In this investigation, commonly available medicinal plants, herbs and trees have been identified, collected and checked for their properties as anti-microbial agents against common microbial pathogens like Gram Positive Bacillus subtilis, Staphylococcus aureus, Micrococcus luteus and Gram negative like Pseudomonas aeruginosa, Proteus vulgaris. Their chemical components were analysed and found to contain consistently common ingredients which may be responsible for their antimicrobial activity. Their preservation and propagation is a need of time, establishing the requirement of reverting to naturopathy.*

**Key words:** biodiversity, ethnic medicinal plants, therapeutic agents, anti-microbial agents, microbial pathogens, chemical components, Preservation and Propagation

### INTRODUCTION:

Sangli District is located in the western part of Maharashtra, India. It is bound by Satara and Solapur districts to the north, Bijapur District (Karnataka) to the east, Kolhapur and Belgaum (Karnataka) districts to the south, and Ratnagiri District to the west. Sangli District is situated in the river basins of the Warna and Krishna rivers. Other small rivers, such as the Warana and the Panchganga, flow into the River Krishna. Land in the region is suitable for agriculture and is fertile. The latitude of Sangli, Maharashtra, India is 16.867634 and the longitude is 74.570389. Sangli, Maharashtra, India is located at India country in the Cities place category with the GPS coordinates of 16° 52' 3.4824" N and 74° 34' 13.4004" E. Its elevation is 548 meters height, that is equal to 1,798 feet.

The region shows a variety of characteristics: to the west there are the Konkan lowlands, a narrow strip along the coast which is marked by numerous small hills. Most of the region is dissected by the Western Ghats running from north to south over a distance of 640 km whose mountains reach heights of up to 1,340 m. These continue to the east as the Deccan Plateau which is a plain dissected by fertile river valleys which rise in the Western Ghats and run eastwards crossing the Indian subcontinent to flow into the sea in the Bay of Bengal. The district of Sangli is located in the fertile lowlands of the Krishna and Warana rivers.

The climate is tropical with a mean minimum temperature of 19°C in January and maximum day temperatures of around 38°C in May. The monsoon brings the region a marked rainy period between June and October with an annual precipitation of around 2,000 mm on the coast and in the East of Maharashtra. Particularly the Ghats and neighbouring regions suffer from distinct periods of drought. There are four seasons: between March and May it is hot and dry, from June to September it is hot and wet, from October to November it is warm and humid and from December to February it is cool and dry.



The districts of Sangli lies in the south of the state where biogas programmes are run because of extensively agricultural areas. Majority of commercially important medicinal crops are cultivated in India because of its geographical location and suitable climate. Plants suggest a dynamic stability through change (Baskar and Chezhiyan, 2002-e). Plants are known to improve and maintain physical and mental health; help in social adjustment, educational training, occupational status, recreation and develop a constructive hobby. Importance of medicinal plants is more because of escalating population, increasing standard of living and hazards shown by synthetic chemicals. Plants provide safer, cost effective drugs with least or no side effects. Roots of about 680 species have been used for medicinal purposes by tribals, ancient medical practitioners on a small or large scale (Das and Agarwal, 1985). Dried leaves, powders or scrapings of readily available herbs and plant parts are commonly used to treat common infections. In the present study, commonly available plants, herbs and trees were selected for checking their antimicrobial activity. A number of authors have reported the antimicrobial properties of garlic extract (Rao, 1947; Wills, 1956; Fliermans, 1973; Tansey and Appleton, 1975). Extracts of various spices, one of which is garlic (Sastri, 1952) have been reported as antioxidants of non-enzymatic category. Biodiversity is abundant here with reference to ethnic medicinal plants, great therapeutic agents. Sangli, situated in the rich and fertile bed of Krishna river bank is endowed with a large number of medicinal plants.

In this investigation, commonly available medicinal plants, herbs and trees have been identified, selected, collected in appropriate seasons and checked. Selection was done on the basis of interviews with ayurvedic doctors and personnel and aged people using them for years. The knowledge about the medicinal plants has been handed down through generations. The plant parts known to have medicinal value were used for the study. They were analysed for their properties as anti-microbial agents against common microbial pathogens like Gram Positive *Bacillus subtilis*, *Staphylococcus aureus*, *Micrococcus luteus* and Gram negative like *Pseudomonas aeruginosa*, *Proteus vulgaris*. Their chemical components were analysed and found to contain consistently common ingredients which may be responsible for their antimicrobial activity.

Their preservation and propagation is a need of time, establishing the requirement of reverting to naturopathy. The use of these plants as antimicrobial agents once again confirms the need for preserving and propagating such ethnic medicinal agents and has become a need of the time.

## **MATERIAL AND METHODS:**

### **Survey and selection of medicinal plants for this study:**

Survey of medicinal plants was done in and around Sangli by visiting various sites. Factors like availability of these plants, the seasons in which they are present in ample amount and the purpose for which they are used have been taken into consideration.

*Allium sativum* (Lasoon), *Aloe vera* (Korfad), *Andropogum citratum* (Gavati chaha), *Azadirachta indica* (Kadu nimb), *Calotropis gigantea* (Rui), *Catharanthus roseus* (Sadaphuli) and *Curcuma longa* (Haladi), which are abundantly found in Sangli region, have been selected for the present investigation.

**Allium sativum (Lasoon)** belongs to family Liliaceae. It is a glabrous, bulbous herb, with flat narrow and long leaves. Bulbs with bulblets, within a whitish skin are called cloves, achieving a height of 30 cm. It contains essential oil and Sulphur, Allyl propyl disulphide, Di-allyl disulphide, Allicin, Allisatin I and Allisatin II. It is excellent for treating colds, sore throat, hoarseness and tonsillitis. It is a natural antibiotic, antiseptic agent preventing cancer and hypertension. It is known to give relief from deafness, earache, skin problems and delays graying of hairs. It reduces cholesterol in the body. Garlic juice is used raw, internally and externally, as decoction in coconut oil, as garlic tea and externally as a poultice (Kurian, 1999).

**Aloe vera (Korfad)**, a member of family Liliaceae, is a short stemmed plant with spiny teathed, very succulent and juicy leaves, reaching one-meter height. It is found to contain aloin, isobarbaloin, emodin, gum, resin, anthroquinone derivatives, chrysophanic acid, oxidase, catalase, sugars and crystalline glycoside barbaloin (Kurian, 1999). *Aloe vera* is used for treating burns, hair growth, wound healing without scar formation, piles, cough and cold (Raina, 1982). It has been used for thousands of years, in traditional medicines, as a laxative, skin protector, for treating sinusitis, fever and muscular pain (Mukundan et al, 2002). Leaf juice has moisturizing, emollient properties and anti-ageing effects on the skin (Canigueral and Vila, 1994). *A. vera* juice is applied externally, for burns, cuts, wounds, eczema, falling hair, while leaf pulp and cuticle is used as a suppository in haemorrhoids or piles. It is used to treat indigestion, dandruff, nausea, acidity and anaemia. Active principles in leaves are aloesone, aloesin, barbuloins, used as a purgative, in treatment of liver disorders, rheumatism, hair growth, chronic ulcers, intestinal worms and cold. Mucilaginous substance obtained from leaves is commercially used as a base material for vanishing creams and moisturizer (Baskar et al, 2002-d).

**Andropogon citratus (Gavati chaha)** belongs to the family Gramineae. It is a popular perennial, medicinal grass, cultivated for fragrant leaves which are a meter long. A lemon-like fragrance is emitted when the leaves are crushed. It strengthens and tones the stomach, expels gases, flatulence and gripping pains from stomach and bowels, giving vitality to the body, lowers body heat, prevents and cures spasms, anti-vomitting, diarrhoea, headache, dysmenorrhoea, chronic rheumatism, sprains, correcting lumbago, insomnia and other painful conditions. Leaf-extract is used internally with herbal tea or milk. *A. citratus* is reported to have antimutagenic, anti-flatulence, anti-emetic, anti-arthritic activities and known to decrease menstrual complaints. It contains essential oil, citral and verbena (Kurian, 1999).

**Azadirachta indica (Kadu nimb)**, a member of family Meliaceae, is a native of Persia and Asia minor. It occurs wild in dry forests and is planted all over India. It is a perennial, ever-green big tree found in Indian ghats. It shows flowering and fruiting in March, April and May. It is a drupe, fruits glabrous, fleshy, light yellow, smooth and oval-elongated. It has a medium height, bark dark green to brown, with lateral straight scars, soft hairy tops. Its leaves are tri-lobed, cut at sides, rounded at tips, rituparni. The flowers are maroon, light violet, smell like honey, have soft hairy. It contains Azaridine, resin, tannin, meliotannic acid, benzoic acid, bakayanin, sterols, margosine and fixed oil with Sulphur (Sawant, 1974). Neem oil contains glycerides of saturated and unsaturated fatty acids as active constituents

(Kokate et al, 2001). Barks, flowers, seed oil and tender twigs are used as antiseptic, antifungal, blood purifying agents, in skin diseases, cosmetics and as bio-pesticides (Baskar et al, 2002-d). It is globally used for skin allergy, as an antidote for insect bites and asthma (Baskar and Chezhiyan, 2002-b).

***Calotropis gigantea* (Rui)** belongs to family Asclepiadaceae. The plant is wild in tropical countries of Asia. It is a medium sized shrub about three meters high. It has a pale bark and heart-shaped leaves. Leaves are cottony on under-surface, pointed at the tip with axillary simple or compound flowers. Seeds are ovate with white-silky coma or floss. Its leaves, roots and juice of young floral buds has medicinal properties. It gives relief from abdominal pains, ulcers, earache and some skin diseases. It soothes wounds and is a digestive. Its latex contains resins, uscharin, catachin, alpha calotripeol, beta-calotripeol, beta amyryl, Ca-oxalate and stem bark contains alpha calotripeol, beta-calotripeol, beta amyryl and root bark contains beta amyryl (Kurian, 1999). Warm leaves of rui are used as a poultice on edematous regions (Sonawane et al, 2006).

***Cassia auriculata* (Tarwad)** belonging to family Leguminosae, exists as a herb and a shrub. It is found in saline soils and shallow soil regions. Very frequently it is found in ghats and Konkan region, Sangli district, Baramati, Indapur and Kankavali. It has primary, secondary roots and rhizoids. The tree is two-four meters tall, upright with a reddish, smooth and branched stem. Extract of the bark is used for gargling in throat infections, is anti-diabetic, reduces thirst, urine and mucous in stools and used in male infertility. Bark has 15.2 - 19.1% tannin (Kurian, 1999).

***Catharanthus roseus* (Sadaphuli)** a member of family Solanaceae, is a small plant which thrives without much care. It grows in gardens, on sea-shores and in sandy areas. It has a bad odour and has gained great popularity for its medicinal values. It has a few branches and grows to a fifty cm. height. It has oblong, glossy leaves, flowers white or purplish pink, fruit cylindrical, length 2-3 cm. Its various parts are used for medicinal purposes. The whole plant, including the roots, may be used in medicine. In India, the juice of fresh *C. roseus* leaves has been applied topically to treat venomous insect bites. A solution made from the whole plant has been used to control bleeding and as a mouthwash to ease sore throats. It is known to promote menstrual flow, softens swollen parts and relieves pains in the muscles. It works as a good laxative, kills or expels worms from the body, heals wounds, fresh cuts, soothes burns, cures eczema, falling hair and eye-diseases. It checks growth of tumours, enlargement of the spleen, liver complaints, asthma, leprosy and jaundice (Kurian, 2004).

***Curcuma longa* (Haladi)** belonging to family Scitamineae, is an annual, medicinal herb planted in plenty in Konkan, Satara and Sangli region. It has fibrous roots, modified stem, rhizome and main stem. It has nodes and peri-nodes, axillary buds, scaly leaves and lives for many years. The plant is cultivated for the rhizome and ornamental purpose. It is applied externally and consumed internally. Moist roots are dried and used (Sathe, 1998). Medicinally it is used to expel gases, flatulence, gripping pains from the stomach and bowels, alters the process of nutrition and excretion, restoring the normal functions of the body. It is used to treat bronchitis, diarrhoea, intermittent fever, abnormal accumulation of fluids in cellular tissue, jaundice and liver problems. It is used against chest-pain, cold, cough, diabetes, scabies, itch, pustules of smallpox, chicken-pox and measles.

Rhizome of *C. longa* is externally used as a powder, paste, lotion or oil, ointment and decoction (Sawant, 1974). It is effective in traditional medicine. It is known to be a blood purifier and along with neem fruits, consumed in case of scabies, itching and applied topically. Worms are traditionally treated with haladi and jaggery. It is used in cases of excessive incontinence, poisoning, conjunctivitis, piles and as an antiseptic in peri and post-delivery cases (Sathe, 1998).

### **OBSERVATION AND RESULTS**

The selected plants and their known anti-microbially effective parts were used for preparing aqueous extracts in known concentrations and antimicrobial activity checked with the help of agar diffusion assay. They were found to be efficient against common pathogenic microorganisms like Gram Positive *Bacillus subtilis*, *Staphylococcus aureus*, *Micrococcus luteus* and Gram negative like *Pseudomonas aeruginosa*, *Proteus vulgaris*. Their chemical components were then analyzed to check the reason for their efficiency. Components included flavonoids, alkaloids, tri-terpenoids and tannins.

### **DISCUSSION AND CONCLUSION**

Biodiversity in Sangli region is significant. Medicinal plants are available in plenty and in definite seasons. Antimicrobial activity elicited in terms of inhibition zones by agar diffusion method showed that the selected medicinal plants show excellent anti-microbial activity. On comparison with the antibiotics, it can be concluded that the activities are comparable and significant. Results are comparable with the review of literature. The present study allows us to deliberate upon whether they can be useful as an alternative for allopathic therapy as they show potential use as antimicrobial agents. Further studies need to be done to substantiate these results.

### **SUGGESTIONS**

The results of the present study lead to an information on various anti-microbial properties of selected medicinal plants, confirming once again that nature has cure against most natural invasions. This helps in a newer perspective towards the biodiversity, properties and use of easily available medicinal plants. This once again stresses the need for their special cultivation, protection and preservation. Moreover, they are known to be safe and exhibiting minimum or no side effects, as compared to standard antibiotics. Biodiversity in Sangli region adds to the commercial and practical aspects of the area.

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